

Course Name : 03 Years Diploma in Engineering

Semester : First

Subject Title : Engineering Physics-I

Subject Code : 103/ 107

Teaching and Examination Scheme:

Teaching Scheme			Examination					
L	T	P	Full Marks.	External Exam Marks	Internal Exam Marks	External Pas Marks	Total Pass Marks	Duration of External Exams
03	1		100	80	20	26	40	3 Hrs
Practical		2	50	40	10	13	20	4 Hrs

NOTE:

Internal marks will be allotted on the basis of two snap tests and 2 assignment of equal marks to be conducted by the faculty teaching the subject.

RATIONALE:

Basic science forms the foundation of Engineering. In particular Physics provides fundamental facts, principles, laws, and proper sequence of events to streamline Engineering knowledge.

OBJECTIVES:

Student will be able to:

- Measure given dimensions by using appropriate instruments accurately.
- Select proper measuring instrument on the basis of range, least count & precision required for measurement.
- Differentiate kinetic and kinematics and solve the problems on kinematics and kinetics.
- Use principles of illumination for enhancing work efficiency.
- Analyze variation of sound intensity with respect to distance.
- Identify different factors affecting acoustical planning of buildings.
- Select proper material for intended purpose by studying properties of materials.
- Identify good & bad conductors of heat.
- Identify, analyze, discriminate and interpret logical sequence of field problems with the study of physics.

CONTENTS: Theory

CHAPTER	CONTENT	HOURS	MARKS
1.	<p>UNITS AND MEASUREMENTS</p> <p>1.1 Need of measurement and unit in engineering and science, definition of unit , requirements of standard unit, systems of units-CGS,MKS and SI, fundamental and derived quantities and their units</p> <p>1.2 Definition of dimensions with examples, principle of homogeneity of dimensions, limitations of dimensions.</p> <p>1.3 Definition of accuracy, precision and error, estimation of errors – absolute error, relative error and percentage error, rules and identification of significant figures.</p> <p>(Numericals on percentage error and significant figures)</p>	04	06
2	<p>MECHANICS</p> <p>2.1 Motion along a straight line and Force Concept of scalar and vector quantities, Equations of motion with constant acceleration (derivation not required), Equations of motion of falling body under gravity, Newton’s laws of motion, Force, inertia, Action and reaction, tension, , momentum, impulse and impulsive force with practical examples (basic Idea), Conservation of linear momentum,</p> <p>(Simple problems on linear motion)</p>	04	10
	<p>2.2 Angular Motion Definition of angular displacement, angular velocity and angular acceleration, relation between linear velocity and angular velocity, definition of simple harmonic motion (SHM), SHM as a projection of uniform circular motion on any diameter, equation of SHM, derivation of displacement, velocity and acceleration of a body executing SHM.</p>	05	08
3	<p>GRAVITATION Newton’s laws of gravitation, Newton’s gravitational constant (G) and its SI unit, Acceleration due to gravity (g) and its relation with “G”, Variation of g with altitude and latitude(deduction not required)</p> <p>(Simple problems)</p>	03	06
4.	<p>WORK , ENERGY & POWER Definition of work, energy and power, equations for P.E. & K.E., Work-Energy principle, Representation of work by using graph, work done by a torque (no derivation)</p> <p>(Numericals on work, potential and kinetic energy)</p>	02	06

5.	GENERAL PROPERTIES OF MATTER 5.1 Elasticity Deforming force, restoring force, elastic and plastic body, stress and strain with their types. elastic limit, Hooke's law, Young's modulus, bulk modulus, modulus of rigidity and relation between them (no derivation). (Numerical on stress, strain and Young's modulus)	04	08
	5.2 Surface Tension. Molecular force, cohesive and adhesive force, Molecular range , sphere of influence, Laplace's molecular theory, Definition of surface tension and its S.I. unit, angle of contact, capillary action with examples, shape of meniscus for water and mercury, relation between surface tension , capillary rise and radius of capillary (no derivation),effect of impurity and temperature on surface tension (Numerical on relation between surface tension, capillary rise and radius)	04	08
	5.3 Viscosity Definition of viscosity, viscous force, velocity gradient, Newton's law of viscosity, coefficient of viscosity and its S.I. unit, streamline and turbulent flow with examples, critical velocity, Reynolds's number and its significance, derivation of viscous force for free fall of spherical body through viscous medium, upthrust, terminal velocity, Stoke's law (statement and formula). (Numerical on coefficient of viscosity, Reynolds number and Stoke's formula)	04	08
CHAPTER	CONTENT	HOURS	MARKS
6	HEAT Transmission of heat and expansion of solids: Three modes of transmission of heat -conduction, convection and radiation, good and bad conductor of heat with examples, law of thermal conductivity, coefficient of thermal conductivity and its S.I. unit, Definition of linear, aerial and cubical expansion and relation between them. (no derivation) (Numericals on law of thermal conductivity, and coefficients of expansions)	04	08
7	ACOUSTICS 7.1 Sound Definition of wave motion, amplitude, period, frequency, and wavelength, relation between velocity, frequency and wavelength , longitudinal and transverse wave, definition of stationary wave , node and antinode, forced and free vibrations, definition of resonance with examples, derivation of formula for velocity of sound with end correction. (Numericals on relation $v = n\lambda$ and resonance)	04	06

	7.2 Acoustics of Building Acoustics-concept and definition, Intensity and loudness of sound, echo, Reverberation standard reverberation time, Sabine's formula, Conditions for good acoustics, Factors affecting Acoustical planning of auditorium. (Numericals on Sabine's formula)	04	06
TOTAL		42	80

Practical:

Skills to be developed

1) Intellectual skills-

- Proper selection of measuring instruments on the basis of range, least count, precision and accuracy required for measurement.
- Analyze properties of matter & their use for the selection of material.
- To verify the principles, laws, using given instruments under different conditions.
- To read and interpret the graph.
- To interpret the results from observations and calculations.
- To use these results for parallel problems.

2) Motor skills-

- Proper handling of instruments.
- Measuring physical quantities accurately.
- To observe the phenomenon and to list the observations in proper tabular form.
- To adopt proper procedure while performing the experiment.
- To plot the graphs.

List of Experiments:

1. To know your Physics Laboratory.
2. To use Vernier Callipers for the measurement of dimensions of given object.
3. To use Micrometer Screw Gauge for the measurement of dimensions (Length, Thickness, Diameter) of given object.
4. To use spherometer for the measurement of thickness of a given glass piece.
5. To calculate Young's modulus of elasticity of steel wire by Vernier method
6. To study capillary phenomenon and to verify that the height of liquid in capillary is inversely proportional to the radius of capillary
7. To determine coefficient of viscosity of given liquid using Stoke's Method
8. To calculate the Linear Thermal coefficient of expansion for copper by using Pullinger's apparatus.
9. To determine refractive index of a glass using glass slab by pin method. ($\sin i / \sin r = \mu$).
10. To determine the velocity of sound by using resonance tube.

Reference Books:

Sr. No.	Name of book	Author	Publisher & Address
1.	Physics-I	V. Rajendran	Tata McGraw- Hill raw- Hill publication, New Delhi
2.	Applied physics	Arthur Beiser	Tata McGraw- Hill raw- Hill Publication, New Delhi
3.	Engineering Physics	by R.K.Gaur and S.L.Gupta	Dhanpat Rai Publication, New Delhi.
4.	Fundamentals of Physics	Resnick ,Halliday & Walker	Wiley India Pvt. Ltd.
5.	Core Physics-I	A. Kumar	Bharti Bhavan
6.	Pradeep's Fundamental Physics-XI	K.L. Gomber & K.L Gogia	Pradeep Publication
7.	S. Chand's Principles of Physics-XI	V.K Mehta & Rohit Mehta	S. Chand Publication
8.	Dinesh New Millennium Physics-XI	S. K Sharma	Dinesh Publication